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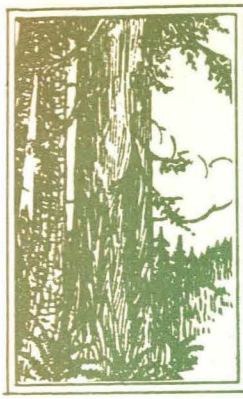
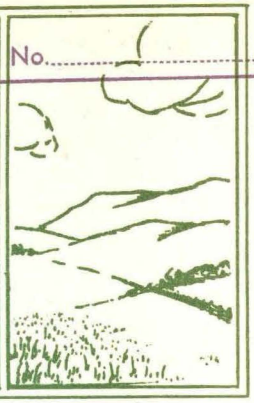


FOREST RESEARCH NOTES

U.S.DEPARTMENT OF AGRICULTURE
FOREST SERVICE
CALIFORNIA FOREST AND RANGE
EXPERIMENT STATION *

STEPHEN N. WYCKOFF, Director



No. 67 February 23, 1950

BOARD-FOOT AND CUBIC-FOOT VOLUME TABLES FOR SOME CALIFORNIA HARDWOODS

By

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The tables presented here were prepared for estimating tree volumes of some of the most common hardwood species in California: California black oak (Quercus Kelloggii), Oregon white oak (Q. Garryana), Pacific madrone (Arbutus Menziesii), and tanoak (Lithocarpus densiflora). No tables existed previously for these species. The tables were prepared especially to meet the requirements of the nation-wide Forest Survey, but they should be useful also for general cruising.

Method of Construction

The tables were prepared by the logarithmic regression equation method 2/ as applied to form-class tables by Buell 3/. This method expresses volume as a function of d.b.h., height, and form class.

1/ Formerly members of the Division of Forest Economics, California Forest and Range Experiment Station.

2/ Schumacher, F. X., and Hall, F. Dos S. Logarithmic Expression of Timber-Tree Volume. Jour. Agric. Research 47:719 -733. 1933.

3/ Buell, J. H. Outside-bark Form Class Volume Tables for Some Southern Appalachian Species. Technical Note No. 53, Appalachian Forest Experiment Station, Asheville, North Carolina.

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* MAINTAINED AT BERKELEY, CALIFORNIA, IN COOPERATION WITH THE UNIVERSITY OF CALIFORNIA.

Measurements of each tree were plotted on Forest Service Tree Measurement Form 558a. Cubic volume was determined by planimetering on Form 558a. Total cubic volume includes the entire cubic volume of both the main stem and branches to a 4-inch top diameter, while the sawlog cubic volume is limited to the merchantable portion. Board-foot volumes were obtained by scaling the logs in the main stem and forks to a utilized top. The log scaling length was 8 feet plus trim allowance, while the utilized top diameter was never less than 10 inches inside bark. By definition, the minimum merchantable hardwood log was considered to be a log straight and sound enough to produce a 2" x 8" x 8' plank. The total cubic-foot tables include both sawlog trees and cordwood trees, the latter being trees that were too rough to contain a sawlog according to the preceding definition.

Form Class

Form class (Girard's) is the ratio of diameter inside bark at top of the first 16.3-foot log to d.b.h. outside bark, expressed as a percentage. This may be written algebraically:

$$\text{Form class} = \frac{\text{d.i.b. top of first 16.3-ft. log}}{\text{d.b.h. o.b.}} \times 100$$

Figure 1 (page 4) shows the relation of form class to d.b.h. for the sample trees used in preparing the tables. Whether this is a good general representation of the distribution of form class by diameter classes for these species is not known. Considering the limited basis for these curves the values shown should serve only as guides and not be used indiscriminately. Form class should be determined for each stand or locality where the tables are to be used.

Each volume table is prepared for the average form class of the sample trees on which it is based. Multipliers are given, however, for converting volumes to other form classes. By using the multipliers these tables can be readily adapted to fit any particular stand or size class by first determining the form class in the stand to be cruised.

How to Use the Tables

1. Determine form class for each species to be cruised. To get the form class of an individual tree, measure or estimate the taper outside bark from breast height to the top of the first 16-foot log and subtract this amount from d.b.h. to get d.o.b. at the top of the log. Measure bark thickness at the top of the first log if possible. Otherwise use table 13 to get the double bark thickness for the appropriate d.b.h. class and deduct this amount from d.o.b. top of first log to get d.i.b. Enter these values in the equation and compute form class.

Example: Black oak measured d.b.h. o.b. is 24.3 inches, taper to top of first log is 5 inches, double bark thickness is 1.4 inches. Then, d.i.b. top first log = 24.3 - 5 - 1.4 = 17.9.

$$\text{Form class} = \frac{17.9}{24.3} \times 100 = 74\%$$

2. Determine form class on 50 or more trees representing the range of diameter classes for each species in the stand. Plot the average form class for each d.b.h. class as in figure 1. If form class is not related to d.b.h. then an average form class for the species may be used. If form class is definitely related to size of tree, the average form class for each d.b.h. class or group should be used in deriving a table by application of the multipliers.

Example: Board-foot volume of 24.3-inch, 5 log black oak tree of form class 74 = 390 x 1.07 = 417.

3. If volumes by the International 1/4-inch rule are desired, the average factors for conversion from Scribner are given in table 14. Thus, for the 24.3-inch black oak in the above example, the volume by International 1/4-inch rule is 417 x 1.016 = 424 board feet.

4. The total cubic foot tables include the volume of the branches to a 4-inch inside bark minimum as well as of the main stem.

Factors are provided in table 15 for estimating cubic volume, exclusive of branchwood.

Example: Black oak 30 inches d.b.h., total height 80 feet, form class 65, contains 134 cubic feet according to table 3. In table 15 the percentage indicated in branchwood is 15, so that the volume exclusive of branchwood is 134 - .15 (134) = 114 cubic feet.

Limitations of Data

Most of the data were collected along right-of-way clearings for power lines, telephone lines, and roads and therefore are representative of all trees in the stands sampled. The data meet requirements of Forest Survey in this respect but may or may not be representative of timber that is cruised for commercial cutting, where trees are selected to meet certain log-length or quality requirements.

Measurements were taken on trees in the following localities:

Mendocino County:	Percy
Trinity County:	Hayfork, Big Bar, Corral Creek, Browns Creek
Humboldt County:	Garberville, Mattole, Bull Creek, Hartsook Inn
Del Norte County:	Gasquet, Smith River
Josephine County, Oregon:	Kirby, Selma

While the tables are based on a minimum of data, they are believed to be adequate for present purposes in the area represented. As opportunity is afforded, additional data should be collected covering more completely the range of each species. Any information regarding application of the tables in local areas and additional data that may be used to strengthen the tables will be welcomed by the authors.

Additional copies of these tables may be obtained from the California Forest and Range Experiment Station upon request.

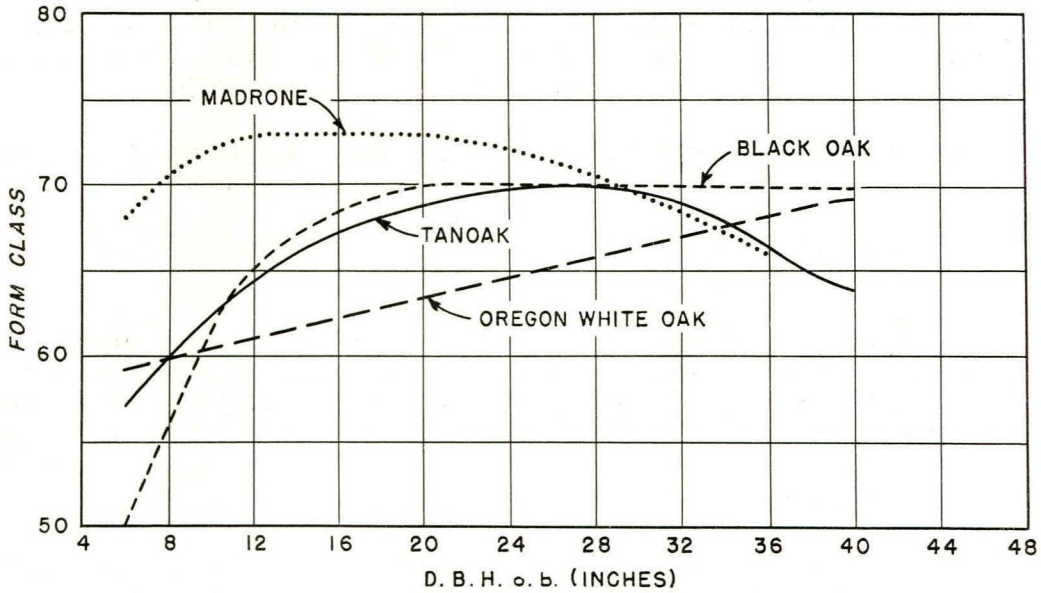

Figure 1. — Average form class by d.b.h. of the sample trees used in preparing the volume tables.

Table 1.- Form-class Volume Table for California Black Oak
BOARD FEET SCRIBNER DECIMAL C LOG RULE
Form Class 70

D.B.H. in Inches:	Volume (board feet in tens) by number of 8-foot logs										Basis: No. of trees
	1	2	3	4	5	6	7	8	9	10	
12	3	4									4
14	4	6	9	11							9
16	5	8	11	14	17	20					11
18	6	11	15	18	22	25					5
20	8	13	18	23	27	31	35				9
22	9	16	22	28	33	38	43	47			3
24	11	19	26	33	39	45	51	56	62		5
26	13	23	31	39	46	53	59	66	72	78	3
28	15	26	36	45	53	61	69	76	84	91	-
30		30	41	51	61	70	79	87	96	104	2
32		34	47	58	69	79	89	99	109	118	1
34		38	52	65	78	90	101	112	122	133	-
36		43	59	73	87	100	113	125	137	149	-
38			65	81	97	111	126	139	152	165	-
40			72	90	107	123	139	154	169	183	-
42			79	99	118	136	153	169	186	201	1
44				109	129	149	168	186	203	221	-
46				119	141	162	183	203	222	241	-
48				129	153	177	199	220	242	262	-
Basis	10	17	9	5	6	2	3	1	-	-	53

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm bd. ft. vol. = I.9693 (logarithm d.b.h. inches) + 0.7718 (logarithm merch. ht. no. 8-ft. logs) + 0.0070 (form class) - 1.1544.

Basis: 53 trees measured in northwestern California.

Stump height 18 inches; top diameter inside bark as utilized but never less than 10 inches; scaled in 8-foot log lengths plus trimming allowance.

Average deviation of individual tree volumes from values estimated by the equation: ± 10.8 percent.

Aggregate difference: estimated values 0.08 percent high.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
5	0.72	0.74	0.75	0.76	0.77	0.79	0.80	0.81	0.82	0.84
6	0.85	0.86	0.88	0.89	0.91	0.92	0.94	0.95	0.97	0.98
7	1.00	1.02	1.03	1.05	1.07	1.08	1.10	1.12	1.14	1.16
8	1.17	1.19	1.21	1.23	1.25	1.27	1.29	1.32	1.34	1.36
9	1.38	1.40	1.43	1.45	1.47	1.50	-	-	-	-

Example: Volume of 34-inch, 6-log tree of form class 76 = 90 x 1.10 = 99.

Prepared by:
Division of Forest Economics
California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

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Table 2.- Form-class Volume Table for California Black Oak

CUBIC FEET IN SAWLOG PORTION

Form Class 70

D.B.H. in inches	Volume (cubic feet) by number of 8-foot logs									Basis No. of trees
	1	2	3	4	5	6	7	8	9	
12	5.5	9.6	13.2							4
14	7.3	12.6	17.3	21.7						9
16	9.2	15.9	21.9	27.5	32.8					11
18	11.3	19.5	26.9	33.8	40.3	46.6				5
20	13.6	23.5	32.4	40.7	48.5	56.1	63.3			9
22	16.1	27.8	38.3	48.1	57.4	66.3	74.9	83.2		3
24	18.7	32.4	44.6	56.0	66.9	77.2	87.2	97.0	106.	5
26		37.3	51.4	64.5	77.0	88.9	100.	112.	122.	3
28		42.5	58.5	73.5	87.7	101.	114.	127.	140.	-
30		47.9	66.1	82.9	99.0	114.	129.	143.	157.	2
32			74.0	92.9	111.	128.	145.	161.	176.	1
34			82.3	103.	123.	142.	161.	179.	196.	-
36			91.0	114.	136.	157.	178.	198.	217.	-
38			100.	126.	150.	173.	196.	217.	239.	-
40				138.	164.	190.	214.	238.	261.	-
42				150.	179.	206.	233.	259.	284.	1
44					194.	224.	253.	281.	309.	-
46					210.	242.	274.	304.	334.	-
48					226.	261.	295.	328.	360.	-
Basis	10	17	9	5	6	2	3	1	-	53

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm cubic ft. vol. = 1.7569 (logarithm d.b.h. inches) + 0.7907 (logarithm merch. ht. no. 8-ft. logs) + 0.0033 (form class) - 1.3834.

Basis: 53 trees measured in northwestern California.

Volume is cubic foot contents, excluding bark, of main stem and forks between stump and utilized top. Stump height 18 inches; top diameter inside bark as utilized but never less than 10 inches.

Average deviation of individual tree volumes from values estimated by the equation: ± 6.19 percent.

Aggregate difference: estimated values 0.27 percent low.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
5	0.86	0.87	0.87	0.88	0.89	0.89	0.90	0.91	0.91	0.92
6	0.93	0.93	0.94	0.95	0.96	0.96	0.97	0.98	0.98	0.99
7	1.00	1.01	1.02	1.02	1.03	1.04	1.05	1.05	1.06	1.07
8	1.08	1.09	1.10	1.10	1.11	1.12	1.13	1.14	1.15	1.16
9	1.16	1.17	1.18	1.19	1.20	1.21	-	-	-	-

Example: Volume of 32-inch, 5-log tree of form class 80 =
111.0 x 1.08 = 119.9.

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California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

February 1950

Table 3.- Form-class Volume Table for California Black Oak
CUBIC FEET INSIDE BARK BETWEEN STUMP AND 4-INCH TOP I.B.
Form Class 65

D.B.H. in inches:	Volume (cubic feet) by total height in feet									Basis: No. of trees
	20	30	40	50	60	70	80	90	100	
6	1.7	2.1	2.5	2.8						2
8	3.2	4.0	4.7	5.3						7
10	5.3	6.7	7.8	8.8	9.7	10.6	11.4			7
12	8.0	10.0	11.7	13.2	14.6	15.9	17.1			8
14	11.3	14.1	16.6	18.7	20.7	22.5	24.2	25.8		13
16	15.3	19.1	22.3	25.2	27.9	30.4	32.7	34.8		12
18		24.9	29.1	32.9	36.3	39.5	42.5	45.4		5
20		31.5	36.8	41.6	46.0	50.1	53.9	57.5		9
22		39.0	45.6	51.6	57.0	62.0	66.7	71.2	75.4	3
24		47.4	55.5	62.7	69.3	75.4	81.1	86.5	91.6	5
26		56.7	66.4	75.0	82.9	90.2	97.1	104.0	110.0	4
28			78.4	88.6	97.9	107.0	115.0	122.	130.	-
30			91.5	103.	114.	124.	134.	143.	151.	2
32				120.	132.	144.	155.	165.	175.	1
34				137.	151.	165.	177.	189.	200.	-
36				156.	172.	187.	201.	215.	228.	-
38				176.	194.	211.	227.	242.	257.	-
40				197.	218.	237.	255.	272.	288.	-
42					243.	264.	284.	303.	321.	1
44					270.	294.	316.	337.	357.	-
46					298.	324.	349.	372.	394.	-
48					328.	357.	384.	409.	434.	-
Basis	2	3	18	17	12	17	6	4	-	79

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm cubic ft. vol. = 2.2425 (logarithm d.b.h. inches) + 0.5482 (logarithm total ht. ft.) + 0.0047 (form class) - 2.5349.

Basis: 79 trees measured in northwestern California.

Volume is cubic foot contents, excluding bark, of main stem and branches between stump and 4-inch top inside bark; stump height varied from 11 to 17 inches for trees up to 12 inches d.b.h., 18-inch stump for trees 12 or more inches d.b.h.

Average deviation of individual tree volumes from values estimated by the equation: ± 14.8 percent.

Aggregate difference: estimated values 0.06 percent low.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
4	0.76	0.77	0.78	0.79	0.80	0.81	0.81	0.82	0.83	0.84
5	0.85	0.86	0.87	0.88	0.89	0.90	0.91	0.92	0.93	0.94
6	0.95	0.96	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.04
7	1.06	1.07	1.08	1.09	1.10	1.11	1.13	1.14	1.15	1.16
8	1.18	1.19	1.20	1.22	1.23	1.24	1.26	1.27	1.28	1.30
9	1.31	1.32	1.34	1.35	1.37	1.38	-	-	-	-

Example: Volume of 30-inch, 80-foot tree of form class 75 =
134 x 1.11 = 148.7

Prepared by:
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California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

February 1950

Table 4.- Form-class Volume Table for Oregon White Oak
BOARD FEET SCRIBNER DECIMAL C LOG RULE
Form Class 68

D.B.H.: in : inches:	Volume (board feet in tens) by number of 8-foot logs 1	2	3	4	5	6	7	8	9	10	:Basis :No. of :trees
12	3	5									4
14	4	7	9	12							12
16	6	9	12	15	18	20					8
18	7	12	15	19	22	25					7
20	9	14	19	23	27	31	34				12
22	10	17	23	28	33	37	41	45			4
24	12	20	27	33	39	44	49	54	58		1
26	14	23	31	38	45	51	57	63	68	73	3
28	17	27	36	44	52	59	66	72	79	85	2
30		31	41	50	59	67	75	83	90	97	4
32		35	47	57	67	76	85	93	102	110	2
34		39	52	64	75	86	95	105	114	123	-
36		44	58	72	84	96	107	117	127	137	1
38			65	80	93	106	118	130	141	152	-
40			72	88	103	117	130	143	156	168	-
42			79	96	113	128	143	157	171	184	-
44				105	123	140	157	172	187	202	-
46				115	134	153	171	188	204	220	-
48				125	146	166	185	204	221	238	-
Basis	14	15	15	10	4	2	-	-	-	-	60

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm bd. ft. vol. = 1.9195 (logarithm d.b.h. inches) + 0.7081 (logarithm merch. ht. no. 8-ft. logs) + 0.0064 (form class) - 0.9932.

Basis: 60 trees measured in northwestern California.

Stump height 18 inches; top diameter inside bark as utilized but never less than 10 inches; scaled in 8-foot log lengths plus trimming allowance.

Average deviation of individual tree volumes from values estimated by the equation: ± 10.6 percent.

Aggregate difference: estimated values 0.00 percent high or low.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
5	0.77	0.78	0.79	0.80	0.81	0.83	0.84	0.85	0.86	0.88
6	0.89	0.90	0.92	0.93	0.94	0.96	0.97	0.99	1.00	1.01
7	1.03	1.05	1.06	1.08	1.09	1.11	1.13	1.14	1.16	1.18
8	1.19	1.21	1.23	1.25	1.27	1.28	1.30	1.32	1.34	1.36
9	1.38	1.40	1.42	1.45	1.47	1.49	-	-	-	-

Example: Volume of 34-inch, 6-log tree of form class 76 = 86 x 1.13 = 97.

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California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

February 1950

Table 5.- Form-class Volume Table for Oregon White Oak

CUBIC FEET IN SAWLOG PORTION

Form Class 68

D.B.H. in inches	Volume (cubic feet) by number of 8-foot logs										Basis No. of trees
	1	2	3	4	5	6	7	8	9	10	
12	6.0	9.7									4
14	8.0	12.9	17.0	20.7							12
16	10.2	16.4	21.7	26.5	30.8	35.0					8
18	12.7	20.4	26.9	32.8	38.3	43.4					7
20	15.3	24.7	32.6	39.8	46.4	52.6	58.4				12
22	18.3	29.4	38.9	47.3	55.2	62.6	69.5	76.2			4
24	21.4	34.5	45.6	55.5	64.7	73.4	81.5	89.4	96.9		1
26	24.8	39.9	52.7	64.3	74.9	84.9	94.4	103.	112.	121.	3
28	28.4	45.7	60.4	73.6	85.8	97.2	108.	118.	128.	138.	2
30		51.8	68.5	83.5	97.3	110.	123.	134.	146.	157.	4
32		58.3	77.1	94.0	110.	124.	138.	151.	164.	176.	2
34		65.2	86.1	105.	122.	139.	154.	169.	183.	197.	-
36		72.3	95.6	116.	136.	154.	171.	188.	203.	219.	1
38			106.	129.	150.	170.	189.	207.	224.	241.	-
40			116.	141.	165.	187.	207.	227.	247.	265.	1
42			127.	154.	180.	204.	227.	249.	269.	290.	-
44				168.	196.	222.	247.	271.	294.	316.	-
46				182.	213.	241.	268.	294.	318.	342.	-
48				197.	230.	260.	289.	317.	344.	370.	-
Basis	14	15	15	10	4	3	-	-	-	-	61

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm cubic ft. vol. = 1.8280 (logarithm d.b.h. inches) + 0.6871 (logarithm merch. ht. no. 8-ft. logs) + 0.0041 (form class) - 1.4711.

Basis: 61 trees measured in northwestern California.

Volume is cubic foot contents, excluding bark, of main stem and forks, between stump and utilized top. Stump height 18 inches; top diameter inside bark as utilized but never less than 10 inches.

Average deviation of individual tree volumes from values estimated by the equation: ± 8.7 percent.

Aggregate difference: estimated values 0.10 percent low.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
5	0.84	0.85	0.86	0.87	0.88	0.88	0.89	0.90	0.91	0.92
6	0.93	0.94	0.94	0.95	0.96	0.97	0.98	0.99	1.00	1.01
7	1.02	1.03	1.04	1.05	1.06	1.07	1.08	1.09	1.10	1.11
8	1.12	1.13	1.14	1.15	1.16	1.17	1.19	1.20	1.21	1.22
9	1.23	1.24	1.25	1.27	1.28	1.29	-	-	-	-

Example: Volume of 32-inch, 5-log tree of form class 78 =
110 x 1.10 = 121

Prepared by:
Division of Forest Economics
California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

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Table 6.- Form-class Volume Table for Oregon White Oak
CUBIC FEET INSIDE BARK BETWEEN STUMP AND 4-INCH TOP I.B.
Form Class 63

D.B.H.: in inches:	Volume (cubic feet) by total height in feet									Basis: No. of trees
	20	30	40	50	60	70	80	90	100	
6	1.4	1.8	2.2	2.5						13
8	2.9	3.7	4.4	5.0						11
10	4.9	6.3	7.5	8.6	9.6					9
12	7.7	9.8	11.7	13.3	14.9	16.3				9
14	11.2	14.3	17.0	19.4	21.6	23.7	25.7			17
16	15.5	19.7	23.5	26.8	29.9	32.8	35.6			9
18		26.3	31.2	35.7	39.9	43.7	47.4	50.9		7
20		33.9	40.4	46.2	51.5	56.5	61.2	65.7		12
22		42.8	50.9	58.2	64.9	71.2	77.2	82.8	88.2	4
24		52.9	62.9	71.9	80.2	88.0	95.3	102.	109.	1
26		64.3	76.4	87.4	97.5	107.	116.	124.	132.	3
28		76.9	91.5	105.	117.	128.	139.	149.	159.	2
30			108.	124.	138.	151.	164.	176.	187.	4
32			127.	145.	161.	177.	192.	206.	219.	2
34				168.	187.	205.	222.	239.	254.	-
36				193.	215.	236.	255.	274.	292.	1
38				220.	245.	269.	291.	313.	333.	-
40				249.	278.	305.	330.	354.	377.	1
42				280.	312.	343.	371.	399.	425.	-
44					350.	384.	416.	447.	476.	-
46					390.	428.	464.	498.	530.	-
48					432.	474.	514.	552.	588.	-
Basis	4	19	29	22	12	11	7	1	-	105

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm cubic ft. vol. = 2.4306 (logarithm d.b.h. inches) + 0.6008 (logarithm total height ft.) + 0.0037 (form class) - 2.7519.

Basis: 105 trees measured in northwestern California.

Volume is cubic foot contents, excluding bark, of main stem and branches between stump and 4-inch top inside bark; stump height varied from 11 to 17 inches for trees up to 12 inches d.b.h., 18-inch stump for trees 12 or more inches d.b.h.

Average deviation of individual tree volumes from values estimated by the equation: ± 17.2 percent.

Aggregate difference: estimated values 0.37 percent high.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
4	0.82	0.83	0.84	0.84	0.85	0.86	0.87	0.87	0.88	0.89
5	0.90	0.90	0.91	0.92	0.93	0.93	0.94	0.95	0.96	0.97
6	0.97	0.98	0.99	1.00	1.01	1.02	1.03	1.03	1.04	1.05
7	1.06	1.07	1.08	1.09	1.10	1.11	1.12	1.13	1.14	1.15
8	1.16	1.17	1.18	1.19	1.20	1.21	1.22	1.23	1.24	1.25
9	1.26	1.27	1.28	1.29	1.30	1.31	-	-	-	-

Example: Volume of 34-inch, 70-foot tree of form class 80 =
205 x 1.16 = 237.8

Prepared by:
Division of Forest Economics
California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

Table 7.- Form-class Volume Table for Pacific Madrone
BOARD FEET SCRIBNER DECIMAL C LOG RULE
Form Class 73

D.B.H. in inches	Volume (board feet in tens) by number of 8-foot logs									Basis No. of trees
	1	2	3	4	5	6	7	8	9	
12	3	5	7							3
14	5	7	9	11						8
16	6	10	12	15	17					6
18	8	13	16	19	22	24				6
20	10	16	20	24	27	31	34	37		7
22	13	19	25	30	34	38	41	45		3
24		23	30	36	41	45	50	54	58	4
26		28	35	42	48	54	59	64	69	4
28		33	42	49	57	63	69	75	81	3
30		38	48	57	66	73	81	87	94	-
32			55	66	75	84	93	100	108	1
34			63	75	86	96	105	114	123	-
36			71	85	97	108	119	129	139	-
38			80	95	109	122	134	145	156	-
40			89	106	122	136	149	162	174	-
42			99	118	135	151	166	180	193	-
44			110	131	149	167	183	199	213	-
46			121	144	164	184	202	218	235	-
48			132	157	180	201	221	239	257	-
Basis	6	8	10	6	6	6	2	1	-	45

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm bd. ft. vol. = 2.1450 (logarithm d.b.h. inches) + 0.6047 (logarithm merch. ht. no. 8-ft. logs) + 0.0065 (form class) - 1.2478.

Basis: 45 trees measured in northwestern California.

Stump height 18 inches; top diameter inside bark as utilized but never less than 10 inches; scaled in 8-foot log lengths plus trimming allowance.

Average deviation of individual tree volumes from values estimated by the equation: ± 9.8 percent.

Aggregate difference: estimated values 0.19 percent low.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
5	0.71	0.72	0.73	0.74	0.75	0.76	0.78	0.79	0.80	0.81
6	0.82	0.84	0.85	0.86	0.87	0.89	0.90	0.91	0.93	0.94
7	0.96	0.97	0.99	1.00	1.02	1.03	1.05	1.06	1.08	1.09
8	1.11	1.13	1.14	1.16	1.18	1.20	1.21	1.23	1.25	1.27
9	1.29	1.31	1.33	1.35	1.37	1.39	-	-	-	-

Example: Volume of a 34-inch, 5-log tree of form class 66 = 86 x 0.90 = 77.

Prepared by:
Division of Forest Economics
California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

Table 8. - Form-class Volume Table for Pacific Madrone

CUBIC FEET IN SAWLOG PORTION

Form Class 73

D.B.H. in inches:	Volume (cubic feet) by number of 8-foot logs									Basis: No. of trees
	1	2	3	4	5	6	7	8	9	
12	6.0	9.9	13.4							3
14	7.8	13.0	17.6	21.7						8
16	9.9	16.5	22.2	27.5	32.4					6
18	12.2	20.3	27.3	33.8	39.9	45.6				6
20	14.6	24.4	32.9	40.7	48.0	54.9	61.5	67.8		7
22	17.3	28.8	38.9	48.1	56.7	64.9	72.7	80.2		3
24		33.6	45.3	56.0	66.1	75.6	84.7	93.4		4
26		38.7	52.2	64.5	76.0	87.0	97.5	108.	117.	4
28		44.1	59.4	73.5	86.6	99.1	111.	123.	134.	3
30		49.7	67.0	82.9	97.7	112.	125.	138.	151.	-
32			75.1	92.9	110.	125.	140.	155.	169.	1
34			83.5	103.	122.	139.	156.	172.	188.	-
36			92.4	114.	135.	154.	173.	190.	208.	-
38			102.	126.	148.	169.	190.	209.	228.	-
40			111.	137.	162.	185.	208.	229.	250.	-
42			121.	150.	176.	202.	226.	250.	272.	-
44			131.	162.	192.	219.	246.	271.	296.	-
46			142.	176.	207.	237.	265.	293.	320.	-
48			153.	189.	223.	255.	286.	316.	344.	-
Basis	6	8	10	6	6	6	2	1	-	45

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm cubic ft. vol. = 1.7562 (logarithm d.b.h. inches) + 0.7378 (logarithm merch. ht. no. 8-ft. logs) + 0.0028 (form class) - 1.3241.

Basis: 45 trees measured in northwestern California.

Volume is cubic foot contents, excluding bark, of main stem and forks between stump and utilized top. Stump height 18 inches; top diameter inside bark as utilized but never less than 10 inches.

Average deviation of individual tree volumes from values estimated by the equation: ± 6.6 percent.

Aggregate difference: estimated values 0.03 percent low.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
5	0.86	0.87	0.87	0.88	0.88	0.89	0.90	0.90	0.91	0.91
6	0.92	0.93	0.93	0.94	0.94	0.95	0.96	0.96	0.97	0.97
7	0.98	0.99	0.99	1.00	1.01	1.01	1.02	1.03	1.03	1.04
8	1.05	1.05	1.06	1.07	1.07	1.08	1.09	1.09	1.10	1.11
9	1.12	1.12	1.13	1.14	1.14	1.15	-	-	-	-

Example: Volume of 32-inch, 5-log tree of form class 80 =
110 x 1.05 = 115.5

Prepared by:
Division of Forest Economics
California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

Table 9.- Form-class Volume Table for Pacific Madrone
CUBIC FEET INSIDE BARK BETWEEN STUMP AND
4-INCH TOP I.B.
Form Class 68

D.B.H. in inches	Volume (cubic feet) by total height in feet										Basis No. of trees
	20	30	40	50	60	70	80	90	100	110	
6	2.0	2.4	2.7	3.0							8
8	3.9	4.7	5.3	5.9	6.4						3
10	6.6	7.9	8.9	9.9	10.7	11.5					9
12	10.0	12.0	13.6	15.1	16.3	17.5	18.6				6
14		17.1	19.4	21.5	23.3	25.0	26.5	28.0			8
16		23.3	26.5	29.2	31.7	34.0	36.1	38.1	39.9		6
18		30.5	34.8	38.4	41.7	44.7	47.4	50.0	52.4	54.7	6
20			44.3	49.0	53.1	57.0	60.5	63.7	66.8	69.7	7
22			55.2	61.0	66.2	71.0	75.4	79.4	83.3	86.9	3
24			67.5	74.6	81.0	86.8	92.1	97.1	102.	106.	4
26			81.3	89.8	97.5	104.	111.	117.	123.	128.	4
28			96.4	107.	116.	124.	132.	139.	145.	152.	3
30				125.	136.	145.	154.	163.	170.	178.	-
32				145.	157.	169.	179.	189.	198.	207.	1
34				167.	181.	194.	206.	217.	228.	238.	-
36				190.	207.	221.	235.	248.	260.	271.	1
38					234.	251.	266.	281.	294.	307.	-
40					264.	282.	300.	316.	331.	346.	-
42					295.	316.	336.	354.	371.	387.	-
44					329.	352.	374.	394.	413.	431.	1
46					364.	390.	414.	437.	458.	478.	-
48					401.	430.	457.	481.	505.	527.	-
Basis	1	5	10	9	11	17	12	2	3	-	70

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm cubic ft. vol. = 2.3098 (logarithm d.b.h. inches) + 0.4481 (logarithm total ht. ft.) + 0.0042 (form class) - 2.3746.

Basis: 70 trees measured in northwestern California.

Volume is cubic foot contents, excluding bark, of main stem and branches between stump and 4-inch top inside bark; stump height varied from 11 to 17 inches for trees up to 12 inches d.b.h., 18-inch stump for trees 12 or more inches d.b.h.

Average deviation of individual tree volumes from values estimated by the equation: ± 11.6 percent.

Aggregate difference: estimated values 0.55 percent high.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
4	0.74	0.75	0.76	0.76	0.77	0.78	0.79	0.79	0.80	0.81
5	0.82	0.82	0.83	0.84	0.85	0.86	0.86	0.87	0.88	0.89
6	0.90	0.91	0.92	0.93	0.93	0.94	0.95	0.96	0.97	0.98
7	0.99	1.00	1.01	1.02	1.03	1.04	1.05	1.06	1.07	1.08
8	1.09	1.10	1.11	1.12	1.13	1.14	1.16	1.17	1.18	1.19
9	1.20	1.21	1.23	1.24	1.25	1.26	-	-	-	-

Example: Volume of 26-inch, 80-foot tree of form class 76 =
111 x 1.05 = 116.6

Prepared by
Division of Forest Economics
California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

Table 10.- Form-class Volume Table for Tanoak
BOARD FEET SCRIBNER DECIMAL C LOG RULE
Form Class 68

D.B.H. in inches	Volume (board feet in tens) by number of 8-foot logs											Basis No. of trees
	1	2	3	4	5	6	7	8	9	10	11	
12	2	4	6									-
14	3	6	9	11	14							5
16	4	7	11	14	17	20						4
18	5	9	13	17	21	25	29					8
20	6	11	16	21	26	30	35	39				9
22	7	13	19	25	30	36	41	46	52			7
24	8	15	22	29	35	42	48	54	60	66	72	5
26		18	26	33	41	48	55	62	69	76	83	6
28		20	29	38	46	55	63	71	79	87	95	4
30		23	33	43	53	62	71	80	89	98	107	2
32			37	48	59	69	80	90	100	110	120	4
34			41	54	66	77	89	100	112	123	134	2
36			46	59	73	86	98	111	124	136	148	1
38			50	65	80	94	108	122	136	150	163	1
40			55	72	88	103	119	134	149	164	179	1
42				78	95	113	129	146	162	179	195	-
44				85	104	122	141	159	176	194	212	-
46				92	112	132	152	172	191	210	229	-
48				99	121	143	164	185	206	226	247	-
Basis	3	5	9	13	8	9	3	2	2	4	1	59

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm bd. ft. vol. = 1.7747 (logarithm d.b.h. inches) + 0.9038 (logarithm merch. ht. no. 8-ft. logs) + 0.0051 (form class) - 0.8792.

Basis: 59 trees measured in northwestern California.

Stump height 18 inches; top diameter inside bark as utilized but never less than 10 inches; scaled in 8-foot log lengths plus trimming allowance.

Average deviation of individual tree volumes from values estimated by the equation: ± 6.4 percent.

Aggregate difference: estimated values 0.24 percent low.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
5	0.81	0.82	0.83	0.84	0.85	0.86	0.87	0.88	0.89	0.90
6	0.91	0.92	0.93	0.94	0.95	0.97	0.98	0.99	1.00	1.01
7	1.02	1.04	1.05	1.06	1.07	1.09	1.10	1.11	1.12	1.14
8	1.15	1.16	1.18	1.19	1.21	1.22	1.24	1.25	1.26	1.28
9	1.29	1.31	1.33	1.34	1.36	1.37	-	-	-	-

Example: Volume of a 30-inch, 6-log tree of form class 76 = 62 x 1.10 = 68.

Prepared by
Division of Forest Economics
California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

Table 11.- Form-class Volume Table for Tanoak
CUBIC FEET IN SAWLOG PORTION
Form Class 68

D.B.H. in inches	Volume (cubic feet) by number of 8-foot logs											Basis No. of trees
	1	2	3	4	5	6	7	8	9	10	11	
12	4.6	7.8	10.6									-
14	6.1	10.6	14.1	17.5	20.8							5
16	7.8	13.2	18.0	22.4	26.6	30.6						4
18	9.7	16.4	22.4	27.9	33.1	38.1	42.8					8
20	11.8	20.0	27.2	34.0	40.3	46.3	52.1	57.7				9
22	14.0	23.8	32.5	40.5	48.1	55.2	62.1	68.8	75.3			7
24	16.5	28.0	38.2	47.6	56.5	64.9	73.0	80.9	88.5	95.9	103.	5
26		32.5	44.3	55.2	65.5	75.3	84.7	93.8	103.	111.	120.	6
28		37.3	50.9	63.4	75.2	86.4	97.2	108.	118.	128.	137.	4
30		42.4	57.8	72.0	85.4	98.2	110.	122.	134.	145.	156.	2
32			65.2	81.2	96.3	111.	125.	138.	151.	164.	176.	4
34			72.9	90.8	108.	124.	139.	154.	169.	183.	197.	2
36			81.0	101.	120.	138.	155.	172.	188.	203.	219.	1
38			89.6	112.	132.	152.	171.	190.	207.	225.	242.	1
40			98.5	123.	146.	167.	188.	209.	228.	247.	266.	1
42				134.	159.	183.	206.	228.	250.	271.	291.	-
44				147.	174.	200.	225.	249.	272.	295.	317.	-
46				159.	189.	217.	244.	270.	296.	321.	345.	-
48				172.	204.	235.	264.	292.	320.	347.	373.	-
Basis	3	5	9	13	8	9	3	2	2	4	1	59

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm cubic ft. vol. = 1.8542 (logarithm d.b.h. inches) + 0.7644 (logarithm merch. ht. no. 8-ft. logs) + 0.0075 (form class) - 1.8517.

Basis: 59 trees measured in northwestern California.

Volume is cubic foot contents, excluding bark, of main stem and forks between stump and utilized top. Stump height 18 inches; top diameter inside bark as utilized but not less than 10 inches.

Average deviation of individual tree volumes from values estimated by the equation: ± 6.0 percent.

Aggregate difference: estimated values 0.01 percent low.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
5	0.73	0.75	0.76	0.77	0.79	0.80	0.81	0.83	0.84	0.86
6	0.87	0.89	0.90	0.92	0.93	0.95	0.97	0.98	1.00	1.02
7	1.04	1.05	1.07	1.09	1.11	1.13	1.15	1.17	1.19	1.21
8	1.23	1.25	1.27	1.30	1.32	1.34	1.36	1.39	1.41	1.44
9	1.46	1.49	1.51	1.54	1.57	1.59	-	-	-	-

Example: Volume of 30-inch, 6-log tree of form class 76 =
98.2 x 1.15 = 112.9

Prepared by:
Division of Forest Economics
California Forest and Range Experiment Station
Forest Service, U. S. Department of Agriculture

Table 12.- Form-class Volume Table for Tanoak

CUBIC FEET INSIDE BARK BETWEEN STUMP AND 4-INCH TOP I.B.

Form Class 65

D.B.H. in inches	Volume (cubic feet) by total height in feet											Basis: No. of trees
	20	30	40	50	60	70	80	90	100	110	120	
6	1.2	1.6	2.0	2.4								4
8	2.2	3.0	3.7	4.4	5.1	5.7						3
10	3.5	4.8	6.0	7.1	8.1	9.1						5
12	5.2	7.1	8.8	10.4	12.0	13.5	14.9	16.3				5
14	7.2	9.9	12.2	14.5	16.6	18.7	20.7	22.6	24.5			11
16		13.1	16.3	19.3	22.1	24.8	27.5	30.0	32.5			4
18		16.8	20.9	24.8	28.4	31.9	35.3	38.6	41.8	44.9		8
20		21.1	26.2	31.0	35.6	40.0	44.2	48.3	52.3	56.2		9
22		25.8	32.1	38.0	43.6	49.0	54.2	59.2	64.1	68.9		7
24			28.6	45.7	52.4	58.9	65.2	71.3	77.2	82.9	88.6	5
26			45.8	54.2	62.2	69.9	77.3	84.5	91.5	98.4	105.	6
28			53.6	63.5	72.9	81.9	90.5	99.0	107.	115.	123.	4
30			62.1	73.5	84.4	94.8	105.	115.	124.	133.	142.	2
32				84.4	96.8	109.	120.	132.	142.	153.	164.	4
34				96.0	110.	124.	137.	150.	162.	174.	186.	2
36				108.	124.	140.	155.	169.	183.	197.	210.	-
38				122.	140.	157.	174.	190.	205.	221.	236.	2
40				136.	156.	175.	194.	212.	229.	246.	263.	1
42				150.	173.	194.	215.	235.	254.	273.	292.	-
44				166.	191.	214.	237.	259.	281.	302.	322.	-
46				183.	210.	236.	261.	285.	309.	332.	354.	-
48				200.	230.	258.	285.	312.	338.	363.	388.	-
Basis	-	2	5	9	11	15	18	6	8	3	5	82

Block indicates extent of basic data.

Form Class: Diameter inside bark at top of first 16.3-foot log divided by diameter outside bark at breast height, the result being multiplied by 100. Table above is for the average Form Class of the sample trees. Factors in the tabulation on the reverse side are to be used to get volumes for other Form Classes.

Table constructed from the equation: Logarithm cubic ft. vol. = 2.1300 (logarithm d.b.h. inches) + 0.7560 (logarithm total ht. ft.) + 0.0092 (form class) - 3.1624.

Basis: 82 trees measured in northwestern California.

Volume is cubic foot contents, excluding bark, of main stem and branches between stump and 4-inch top inside bark; stump height varied from 11 to 17 inches for trees up to 12 inches d.b.h., 18-inch stump for trees 12 or more inches d.b.h.

Average deviation of individual tree volumes from values estimated by the equation: ± 10.9 percent.

Aggregate difference: estimated values 0.06 percent low.

MULTIPLIERS FOR OTHER FORM CLASSES

Factors by which to multiply volumes in the average table to obtain volumes for other Form Classes

Form Class (Tens)	(Units) 0	1	2	3	4	5	6	7	8	9
	Factors									
4	0.59	0.60	0.61	0.63	0.64	0.65	0.67	0.68	0.70	0.71
5	0.73	0.74	0.76	0.78	0.79	0.81	0.83	0.84	0.86	0.88
6	0.90	0.92	0.94	0.96	0.98	1.00	1.02	1.04	1.07	1.09
7	1.11	1.14	1.16	1.18	1.21	1.24	1.26	1.29	1.32	1.35
8	1.37	1.40	1.43	1.46	1.50	1.53	1.56	1.59	1.63	1.66
9	1.70	1.73	1.77	1.81	1.85	1.89	-	-	-	-

Example: Volume of 30-inch, 80-foot tree of form class 75 =
105 x 1.24 = 130.2

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Table 13.- Double bark thickness at top of first 16.3-foot log[1/]

D.B.H. o.b. (inches)	Double bark thickness, inches			
	Black oak	Oregon white oak	Pacific madrone	Tanoak
8	0.4	0.4	0.2	0.6
10	0.5	0.5	0.3	0.8
12	0.7	0.6	0.3	1.0
14	0.8	0.7	0.4	1.2
16	0.9	0.7	0.4	1.4
18	1.1	0.8	0.4	1.6
20	1.2	0.8	0.4	1.7
22	1.3	0.9	0.4	1.8
24	1.4	0.9	0.5	2.0
26	1.5	0.9	0.5	2.0
28	1.6	0.9	0.5	2.1
30	1.7	0.9	0.5	2.2
32	1.7	1.0	0.5	2.2
34	1.8	1.0	0.5	2.2
36	1.9	1.0	0.5	2.3
38	1.9	1.0	0.5	2.3
40	2.0	1.0	0.5	2.3
42	2.1	1.0	0.5	2.4
44	2.1	1.0	0.5	2.4
46	2.2	1.0	0.5	2.4
48	2.2	1.0	0.5	2.5

1/ Measured from uphill side with a stump height of 15 inches for trees 8 inches d.b.h., 17 inches for trees 10 inches d.b.h., and 18 inches for larger sizes. This places the point of measurement at 17.8 feet above the ground for trees 12 inches d.b.h. and over.

Table 14.- Converting factors for some California hardwoods

D.B.H. Inches	Board feet Scribner to International 1/4" (multiply)
12	1.037
14	1.031
16	1.026
18	1.022
20	1.019
22	1.017
24	1.016
26	1.014
28	1.013
30	1.012
32	1.012
34	1.011
36	1.010
38	1.010
40	1.010
42	1.009
44	1.009
46	1.009
48	1.009

Basis: 274 trees, including red alder, golden chinquapin, California laurel, Pacific madrone, bigleaf maple, black oak, Oregon white oak, interior live oak, and tanoak.

Table 15.- Proportion of total cubic volume of main stem and branches, to 4-inch top, that occurs in branches[1]/

D.B.H. in Inches	Proportion of branchwood volume to total cubic volume			
	Black oak	Oregon white oak	Pacific madrone	Tanoak
	Percent			
6	0.0	0.0	0.0	0.0
8	3.2	7.0	0.8	0.0
10	6.0	11.2	2.2	0.5
12	8.0	14.4	4.5	1.1
14	9.7	16.6	7.2	1.6
16	10.9	18.5	8.3	2.0
18	12.0	19.9	10.8	2.3
20	12.7	21.0	12.3	2.6
22	13.4	21.8	13.2	2.8
24	13.8	22.5	14.0	3.0
26	14.3	23.0	14.5	3.2
28	14.6	23.4	14.7	3.4
30	14.8	23.6	14.9	3.5
32	14.9	23.7	15.0	3.6
34	15.0	23.7	15.1	3.7
36	15.0	23.8	15.2	3.8
38	15.1	23.8	15.3	3.9
40	15.1	23.9	15.4	3.9
42	15.1	23.9	15.5	3.9
44	15.1	24.0	15.5	4.0
46	15.1	24.0	15.5	4.0
48	15.1	24.0	15.5	4.0
No. of trees	79	105	71	81

1/ Total cubic volume includes volume of main stem and branches, excluding bark, between stump and 4-inch top inside bark.